

# Alternative Supply Chain Strategies for Mitigating the Impact of Higher Fuel Costs

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Leonard Sahling and Paul Nuzum



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## Executive Summary

Today's high oil and fuel prices are spurring companies to reevaluate their supply chains and distribution networks in a quest to find offsetting cost savings. Many analysts have maintained that companies will respond to the higher fuel prices by adding more distribution centers (DCs) to their distribution networks in order to reduce the average distance between these facilities and their customer destinations. Supply chain experts concur. "As outbound transportation becomes more expensive," Professor David Simchi-Levi of MIT points out, "it becomes increasingly important to minimize the distance of the final leg [of the supply chain]." This inference is surely right in principle, yet it is unclear how important it is in practice.

We're skeptical about its overall importance. **One of the main findings of this study is that the high and rising prices of oil and fuel will *not* materially increase the demand for distribution facilities in order to reduce the average distance between these facilities and their customer destinations.** Indeed, experts familiar with network modeling tools generally agree that network re-optimizations in response to higher fuel prices seldom result in major, large-scale revisions to these previously optimized networks. Rather, **the new optimal solutions usually involve little more than minor tweaks such as adding one or two DCs to the networks or repositioning one or two DCs to different cities.**

**One new trend to note is in the design of optimized distribution networks. Many companies are examining their trade lanes in search of those where they can aggregate shipments and then move them as full containers or full truckloads.** Shipping full truckloads or full container-loads, it turns out, costs only a fraction of what it costs to ship less-than-full container loads or less-than-truckloads.

**In many cases, companies are finding that the best way to build full container loads or full truckloads is to add a freight-pooling hub (also called mixing centers) to their supply chains.** The idea that companies are actually adding new facilities of any sort to their distribution networks may strike many supply chain practitioners as downright heretical. After all, until recently, the supply chain industry had been on a quest for simpler, less costly and more efficient supply chains. For years, companies had dedicated themselves to streamlining their supply chains – removing redundant, extraneous links, consolidating their distribution networks and increasing inventory turns.

Nonetheless, companies are finding that it is sometimes worthwhile for them to add one or two different kinds of freight-pooling hubs to their supply chains – consolidation centers and deconsolidation centers. Indeed, **they'll add one or more of these freight-pooling hubs to their supply chains if, and only if, the cost savings resulting from shipping the full containers or full truckloads that are created in these facilities exceed the incremental costs of operating the additional facilities.** In practice, companies can create four different kinds of distribution networks, and which one they select will depend on the nature of the shipping volumes. (See *Exhibit 1, page 5.*)

There are essentially two reasons why companies are reluctant to make major adjustments in their distribution networks. First, freight mile and fuel consumption efficiencies are offset to a large extent by higher operating costs. Adding more distribution facilities to networks shortens the average distance traveled by outbound shipments to final destinations, but adds to operating expenses. In some cases, the cost savings in freight transportation from adding extra facilities to

the network will be counterbalanced by the higher operating expenses for the additional facilities and the increased carrying-costs for the higher aggregate level of inventories.

Second, additional warehouse workers must be hired, and each new facility entails incremental occupancy costs for leasing, utilities, maintenance and local taxes.

Insofar as companies were to add DCs to their networks, they would also end up with larger total inventories. That is, the larger the number of DCs:

- the smaller the geographic region served by each one;
- the less often the Law of Large Numbers will succeed in smoothing out random fluctuations in demand within each region;
- the larger the safety stock that each DC must carry to avoid stock-outs; and
- the larger the aggregate inventory that the enterprise must carry.

Another primary reason why so few companies have had to make major changes in their distribution networks is that they have many other cost-cutting measures to adopt. A number of the more popular measures are discussed in the full report. Some are fairly straight-forward such as:

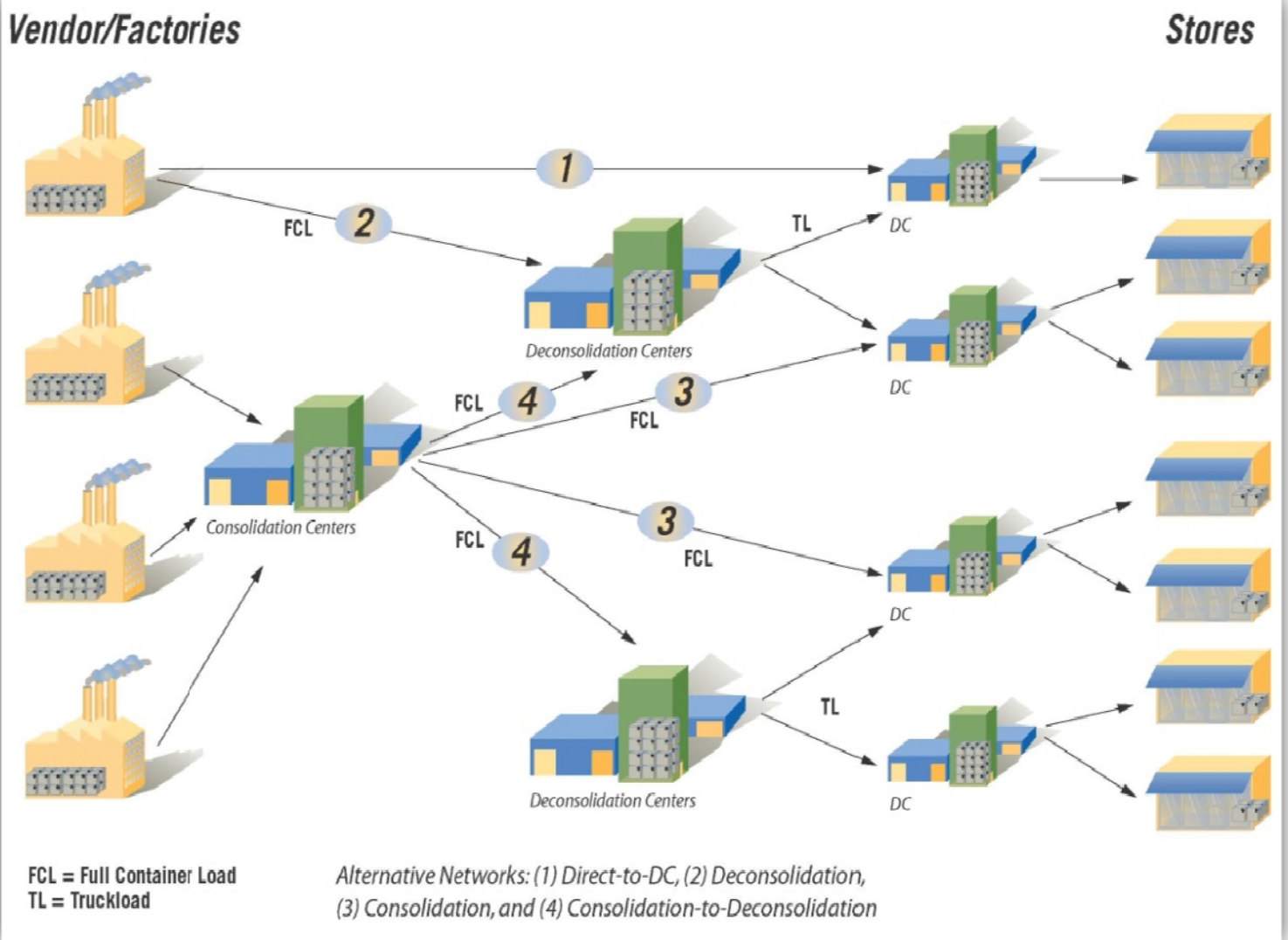
- packing more items into trucks to reduce their unused capacity
- re-negotiating with carriers for lower freight rates or surcharges
- working with carriers to become a preferred customer

Other strategies are more complicated and costly, such as:

- implementing new software to gain enhanced visibility into their supply chains
- establishing close collaborations with suppliers or even competitors

Supply chain professionals are the consummate problem solvers in the business world. Problems are everyday occurrences for them - ranging from missed shipments and flat tires to hurricanes, tornadoes and tsunamis. When problems occur, supply chain professionals figure out how to overcome them, relying on simple or complex strategies. It's what they do every day, and it's what they will continue to do in response to a run-up in oil and fuel prices.

Exhibit 1



## Introduction

Freight transport has become the largest, most volatile cost component of companies' supply chain/logistics operations. The cyclical swings in oil and fuel prices during the past few years have been truly bewildering. Additionally, supply chain executives also have had to cope with driver shortages, fees, regulations, hours-of-service constraints and environmental concerns. Spiraling transportation costs pose a direct threat to companies' bottom lines, and supply chain executives have been tasked with figuring out how to mitigate these cost increases by squeezing more capacity and efficiency out of existing systems.

As part of the research report process, 20 executives in charge of global distribution networks were interviewed to learn how they are managing these challenges. "Transportation costs keep ratcheting higher and higher," lamented one executive. But he went on to say that, "This is the new normal. We just have to get used to it and build whatever is needed to deal with it." This is exactly what companies are doing. From these interviews, combined with extensive Internet research, a list of alternative strategies emerged – ranging from the routinely simple to the boldly ingenious. Companies are using these strategies today to contain or offset the upward trending costs of freight transport, without compromising their service standards.

## Reconfiguring Distribution Networks

Today's high oil and fuel prices are spurring companies to reevaluate their supply chains and distribution networks in a quest to find offsetting cost savings. Many analysts have jumped to the conclusion that companies will respond to the higher fuel prices by adding more distribution centers (DCs) to their distribution networks in order to reduce the overall distances between these facilities and their customer destinations. They're surely right in principle, but it is unclear how big the actual impact will be.

Experts familiar with network modeling tools agree that network re-optimization in response to higher fuel prices seldom results in major, large-scale revisions to these previously optimized networks. Rather, the new optimal solutions usually involve little more than minor tweaks, such as adding one or two DCs to the networks or repositioning one or two DCs to different cities.

The additional one or two facilities, companies are finding, reduce the average distance traveled between shipping points and their final customers, thus economizing on freight miles and fuel consumption. "As outbound transportation becomes more expensive," Professor David Simchi-Levi of MIT points out, "it becomes increasingly important to minimize the distance of the final leg [of the supply chain]."

However, companies often decide either not to adjust their distribution networks at all or to make only minor adjustments. Granted, when companies add DCs to their networks, they succeed in shortening the average distance traveled by outbound shipments to final destinations – and thereby economizing on freight-miles and fuel consumption. Yet these efficiencies are obtained at the expense of higher operating costs. Additional warehouse workers must be hired to staff the new facilities, and each new facility entails incremental occupancy costs for leasing, utilities, maintenance and local taxes.

Even more importantly, as companies add more DCs to their networks, they also will end up with larger aggregate inventories. That is, the larger the number of DCs:

- the smaller the geographic region served by each one;



- the less often the Law of Large Numbers will succeed in smoothing out random fluctuations in demand within each region;
- the larger the safety stock that each DC must carry to avoid stock-outs; and
- the larger the aggregate inventory that the enterprise must carry.

Some companies will then conclude that the cost savings in freight transportation from adding extra facilities to the network will be more than offset both by: 1) the higher operating expenses for the additional facilities; and 2) the additional carrying-costs for the higher aggregate level of inventories.

Although few companies appear to have made large-scale reconfigurations in their distribution networks in response to higher fuel prices, many have implemented tweaks, having targeted specific links within their supply chains where trade-offs favor transportation. For example, a large consumer electronics manufacturer found efficiencies in distributing lower-value products from regional DCs rather than from its central production location because the company could stock those DCs via lower-cost containerized ocean shipments instead of high-cost air freight. At the same time, this company's optimization models also revealed that its higher-value products should continue to be stocked in a centralized distribution location in order to minimize the high inventory carrying-costs.

Along similar lines, some shippers are reconfiguring their networks to eliminate what they refer to as "crooked miles." A manufacturer of high-value network communications equipment, for example, discovered that it was using air freight for both the move from its Asian source, to its European DC and also from the DC to its Middle Eastern customers. This two-legged route, they realized, involved many more miles than a direct delivery route from production source to final customers. "Since it's the same air rates all the way, we are now emphasizing direct customer shipments from our manufacturing source in Asia to our customers, thus bypassing the DC and those extra crooked miles." Similarly, global manufacturers of lower-valued products are also realizing substantial savings by shipping full containers or truckloads directly from their factories to their customers, eliminating the crooked miles involved in routing those shipments to intermediate DCs.

## Opening Freight-Pooling Hubs

With freight transport costs rising, transportation managers everywhere have gone back to their drawing boards to analyze product flows from every origin to every destination. They're searching for freight lanes where they can aggregate shipments and then move them in full containers or full truckloads, thus generating substantial cost savings. A freight lane refers to a well-defined geographic route with specific points of origination and destination. Less-than-full container loads or less-than-truckloads typically cost four-to-five times more to move than full loads.

**In many cases, companies are finding that the best way to build full container loads or full truckloads is to add a freight-pooling hub to their supply chains.** The idea that companies are actually adding new facilities of any sort to their distribution networks may strike many supply chain practitioners as downright heretical. After all, until recently, the supply chain industry had been on a quest for simpler, less costly and more efficient supply chains. For years, companies had dedicated themselves to streamlining their supply chains – removing redundant, extraneous links, consolidating their distribution networks and increasing inventory turns.

Nonetheless, companies are finding that it is sometimes worthwhile adding two different kinds of freight-pooling hubs (also called mixing centers) to their supply chains – consolidation centers and deconsolidation centers. Indeed, **they'll add one or more of these freight-pooling hubs to their supply chains if, and only if, the cost savings resulting from shipping the full containers or full truckloads that are created in these facilities exceed the incremental costs of operating the additional facilities.**

In practice, companies can create four different kinds of distribution networks, and which one they select will depend on the nature of the shipping volumes. (See *Exhibit 1.*)

- **Direct-to-DC Network:** This is the most efficient transportation network. In this case, the vendor or factory ships full container loads directly to each shipper's distribution center (DC), with full-container pricing and no handling of the product between the plant and each DC.
- **Deconsolidation Network:** A shipper will add a deconsolidation center to its network when each of its DCs handles a volume that is less than a full container load, whereas the combined volumes of several DCs do add up to a full container. Various suppliers or factories will ship full containers to the deconsolidation or mixing center where they are split into separate shipments destined for a number of different DCs. There, partial container loads are aggregated into full truckloads destined for each of the shipper's DCs. While a deconsolidation network adds a product-handling step, it also yields cost savings by moving product at full container or truckload rates.
- **Consolidation Network:** A shipper will add a consolidation center to its network if it receives less-than-container volumes from its suppliers or manufacturers. In general, the shipper will locate the consolidation center abroad at the port of origin where less-than-container loads from multiple vendors or factories can be aggregated into full-container loads destined for each of the shipper's DCs in the United States. Although a consolidation network also adds a product-handling step, it too yields cost savings by moving product at full container and truckload rates. (And if the new consolidation center were located in Asia, the workers employed there would be paid at lower Asian wage rates.)
- **Consolidation-to-Deconsolidation Network:** As before, a shipper will add a consolidation center at the point of origin when it receives less-than-container volumes from its suppliers and manufacturers. This time, however, the shipper's DCs do not have large enough inbound volumes to support full container loads from the consolidation center. Instead, the consolidation center ships the full container loads to the shipper's state-side deconsolidation center, where products from other inbound vendors or factories can be mixed and aggregated into full truckloads destined for the shipper's individual DCs. While this network adds two product-handling steps, it also ensures full container and full truckload pricing.

In the three cases involving freight-pooling hubs, the justification for adding an extra link or two into the supply chain is the cost savings from full-container or full truckload pricing. As the costs of freight escalate, so do those cost savings.

## Gaining Enhanced Visibility

As supply chains have become longer and more complex, companies have redoubled their efforts to improve their supply chain visibility and efficiency. The ideal to which they aspire is to know precisely the quantities, locations and status of all goods at all points within the supply chain – including those arriving as inbound shipments from suppliers, those stashed somewhere in their distribution facilities and those delivered as outbound shipments to customers. If they lack this visibility, companies have no idea where to look for greater efficiencies or cost savings in their supply chains, reductions in their inventory carrying costs or improved customer service.

**In general, the better the visibility, the more efficient the supply chain. Better visibility leads to:**

- improved forecasting accuracy because companies can monitor actual end-user demand;
- reduced safety-stock inventories;
- faster reactions to demand signals;
- quicker recognition and response to supply chain glitches; and
- improved planning of labor, transportation and facilities.

Indeed, with supply chains getting longer and more complicated, they pose a heightened risk of glitches or breakdowns. It becomes all the more important for companies to have complete visibility into their supply chains in order to manage those risks and to be able to identify and repair problems when they do arise.

**Companies are experimenting with a wide range of different strategies designed to improve their supply chain visibility. Some are establishing and refining collaborations that allow them to exchange information with their supply chain partners about the status of orders and shipments. Others are focused on improving their internal, cross-departmental visibility to keep everyone informed about the status of in-transit shipments.** One of the executives interviewed explained how he had established an internal communications link that alerted the transportation manager to each purchase order, sales order or work order that would eventually create a shipment of goods. In this way, the transportation manager could arrange in advance for the least-cost mode of transportation for every shipment.

Another manufacturer has succeeded in gaining visibility into its vendors' plans to ship product to it, the manufacturer. The vendors now notify the manufacturer a week in advance of pending shipments, thus allowing them to plan for air freight service that matches the manufacturer's own customer needs while avoiding expediting penalties and also enabling them to use lower cost modes of transport. "It's not about rates anymore" said one executive, "It's visibility that matters." He went on to explain, "Rates ... are a cyclical thing in this industry. You can beat the heck out of a supplier at certain times but then have no choice but to accept an increase at other times. Having the visibility to be proactive in how we plan transportation means that we can avoid air freight when we're not in a jam and also that we can fill a container or truck when we couldn't otherwise."

The nascent field of telematics has opened a whole new window of visibility into freight transport operations. This field is less than 10 years old and involves the collection and dissemination of information to and from vehicles. One application, for example, targets trucks and can be used to monitor tire pressure, fuel consumption, emission-control systems, speed, excessive braking and excessive acceleration. Another application enables transportation routes to be optimized to reduce the number of left-hand turns - the less time that trucks spend waiting for traffic to clear so that they can make left turns translates directly into less fuel consumption. For example, UPS

credits a software program that maps out routes for each of its drivers designed to reduce drastically the number of left-hand turns, with having resulted in a saving of nearly 29 million miles a year. (Joel Lovell, "Left-Hand-Turn Elimination," *New York Times*, December 9, 2007).

## Collaborating More Frequently

Many supply chain executives report that they are spending more of their workdays talking on the telephone with their peers in other companies. According to a supply chain executive at one of the nation's largest retailers, "The whole industry is waking up to the fact that half the trucks on the road are anywhere from half to totally empty. We use a dedicated fleet to service our stores, but they're empty about half the time. We [supply chain executives] have to talk to each other to identify where another company's shipment will eliminate empty miles. It's a win-win where we both end up with lower transport costs."

Talk is cheap, but some supply chain executives are attempting to put their words into action. For example, a retailer based in Colorado delivers products to its stores scattered across the Front Range from a DC located in Denver. One of its suppliers has a plant located at the end of the retailer's delivery route. The retailer's drivers now routinely pick up products from the supplier for delivery to the retailer's DC, thus filling what would otherwise have been costly empty miles back to the DC. The retailer bills the supplier for the cost of the empty miles, which is far below what it would have cost the supplier to deliver those goods. It's a win-win for both the retailer and his supplier.

Similarly, a Midwestern meat packer collaborates with its largest regional grocery customer to identify stores between the meatpacker and the grocery's DCs. The meatpacker's trucks make their deliveries to the grocery's DCs and then pick up shipments from those DCs for delivery to the grocery stores located along the route back to the packer's plant. A supply chain executive of a dairy products company who has formalized a program similar in spirit to the meatpacking example noted, "We focus on our top 10 customers and try to align our supply chain activities with those of our key customers. Our focus is on how to take costs out of serving our key customers, which typically drive 80 percent of our revenues, and help them to take costs out of their supply chains."

### ***Wal-Mart Plans to Take Control of its Inbound Freight***

Even Wal-Mart, with its fleet of almost 7,000 tractors and 55,000 trailers, has unveiled plans to bring the 60 percent of its inbound freight managed by its suppliers, within the umbrella of its own centralized command and control system. Early in 2010, Wal-Mart announced that they would be changing the contractual freight terms on inbound shipments so that Wal-Mart will henceforth manage and pay for these freight movements. (Since then, however, we have heard unofficially that Wal-Mart has opted in a few cases to allow its suppliers to continue to control the inbound shipments because they were more cost-efficient than Wal-Mart.)

Wal-Mart foresees major transport cost savings from this new program. Its truck fleet is used primarily for deliveries from its DCs to its retail stores. This won't change. The inbound logistics that Wal-Mart takes control of will continue to be handled by independent carriers – often the same ones used today by suppliers to deliver to Wal-Mart. The key difference is that Wal-Mart will not only leverage its huge freight volumes to obtain lower freight rates, but also will organize its contracted carriers to increase their reliance on truckload freight-miles in place of the costlier less-than-truckload freight-miles.

Additionally, Wal-Mart is intent on achieving additional economies by reducing the number of empty carrier miles. Under the guidance of Wal-Mart's control center, many of the carriers' now empty repositioning miles used to move their trucks from the Wal-Mart delivery points to the carriers' terminals or their next loads will be used instead as full-loaded miles to the next node in the Wal-Mart distribution network.

Many suppliers have taken a page from Wal-Mart's playbook. Wal-Mart routinely shares its point-of-sale information and forecasts with its suppliers, thus ensuring that the right product will be available at the right time and in the right store. **It now has become a best practice for suppliers to provide their carriers with their own detailed transportation forecasts.**

**First, they compile forecasts of their sales and production schedules. Next, they convert those projected volumes into detailed forecasts of shipments by:**

- size;
- week over the duration of the planning horizon;
- mode (rail, truckload or less-than-truckload); and
- lanes (i.e., pairings of origination and destination points).

Suppliers update their shipment forecasts monthly or even weekly. On the basis of these forecasts, carriers can commit capacity in advance and, if needed, can contract for outside capacity. These updated forecasts are used by the carriers to plan and position capacity for scheduled promotions, seasonal peaks and new business.

Several companies in Europe are collaborating with competitors to create synergistic efficiencies by conjoining their distribution networks – e.g., Bridgestone and Continental Tire in Orleans, France and Samsung and Sony in the Netherlands. The benefits from transport collaboration are the same for competitive rivals as for more traditional collaborators. In using a common distribution facility to ship goods to common or overlapping destinations, the collaborators are able to realize synergies, economies of scale and cost savings in storage, staging, handling and shipping the goods. The transport cost savings and efficiencies alone tend to be substantial. Insofar as truck routes can be combined and streamlined, the trucks end up operating with full loads, yielding major additional cost savings since:

- (a) the cost of full truckloads is just a fraction of the cost of less-than-truckloads; and
- (b) the trucks operate with fewer empty backhauls.

On balance, trucks end up being utilized more efficiently and log fewer freight-miles. Optimizing truck loads through collaboration routinely achieves cost savings of 6 to 10 percent, according to Transport Intelligence, a consultancy specializing in international freight transportation.

## **Transportation Route Optimization**

Virtually all companies today utilize Transportation Management Systems (TMS), and many have recently upgraded to newer-generation TMS solutions with enhanced optimization, visibility and collaboration capabilities. This new software enables users to reduce miles driven and fuel consumed for any given delivery route – local, regional or national. TMS solutions call out consolidation opportunities from combining multiple less-than-truckload shipments into more efficient full truckload moves and also identify shipments which can fill otherwise empty backhaul miles. Typically, users who employ these new TMSs are able to realize savings of 15 to 20 percent in total miles driven. Whereas TMS optimizations used to be run weekly, today they are run daily. One transportation manager summed up the current state of the art as follows: “In real estate, it's location, location, location. Today in transportation, it's optimize, optimize, optimize.”

## Decoupling Freight Cost from Product Cost

**A clear trend emerging from our interviews is that shippers are decoupling their freight cost from their product cost. Previously, suppliers generally paid the freight cost and added it into the products invoice. Now, shippers often insist on knowing how much the freight cost is.** As one supply chain manager explained, “We can’t manage the freight cost if we don’t know what it is.” Many companies, we learned, are using inbound loads to balance their transportation network by filling empty miles or backhauls created by outbound transportation needs, thus resulting in lower costs for both inbound and outbound movements.

## Centralized Command and Control

After getting visibility into their freight costs, many shippers have then established centralized command and control over these costs. [See sidebar for a description of Wal-Mart’s new initiative to extend its centralized command and control over its inbound freight shipments.] Such centralization enables shippers to move their transportation planning operation closer to the point where orders are received, so that it ceases to be an end-of-line function. Absent this centralized command and control, a company’s traffic manager often learns about an order only when it is ready to be shipped, with a tight deadline. As a result, the traffic manager is left with too little time to arrange for the best carrier and freight rates or to combine shipments into full truckloads.

In contrast, when traffic managers are given centralized visibility into the order flow, they have a wider window within which to consolidate shipments and take advantage of truckload discounts, continuous movements and pooled distribution rates. For example, a senior supply chain executive at a manufacturer of household cleaning products reported that centralized visibility enabled his company not only to reduce its off-contract or “maverick” carrier spending, but to also bolster the share of its orders shipped at truckload rates from 35 to 65 percent. Those cost savings to the company’s transportation spend translated into a one percent increase in its bottom line.

After taking responsibility for the freight bill, shippers frequently negotiate favorable freight rates in particular lanes based upon their commitments to carriers to provide specified volumes. These preferential rates are often 7 to 10 percent below benchmarks. Many times, however, shippers fail to realize those rate discounts because, in the absence of centralized command and control, local managers often are unaware of those company-wide agreements and inadvertently use other carriers. The combination of centralized planning, optimization of routes and standardized tendering processes provides companies with tighter controls that enable them to ship goods at the lowest available freight rates.

**Another new best practice calls for companies to use metrics to identify instances where shipments were not made with preferred carriers or where shipments had to be expedited at higher rates.** One freight traffic manager at a food manufacturing company explained that, “We have a P&L for every lane, and we know how far out of the market [benchmark] we are on cost – and we know what’s causing it. When problems occur, our coordinators can say that based on the information we’re getting about a [particular] lane, it’s because some customer is giving us shorter lead times, or because the plant wasn’t ready when the carrier got there. With root-cause analyses like these, we can take corrective action and get back on plan.”

Some companies have been successful in centralizing their command and control over their freight transportation spending within an operational team that extracts all of the visibility, planning, consolidation and optimization information from an advanced TMS program and then manages the execution of freight transport at a very granular level. A supply chain executive at a consumer electronics company mentioned that such an operational team – its “control tower,” in his words – had been created within his enterprise and was very successful: “If we have visibility of the POs [purchase orders] in advance, we can aggregate them and can plan when they should exit the contract manufacturer. Then we can go ocean rather than air. The ‘control tower’ is the team of people who make it happen. We have deployed them regionally to enhance communication and collaboration with our suppliers, carriers and customers. But it is this centralized group with a common set of processes and a common set of tools that manages the transportation execution for us.”

### **Becoming a Preferred Shipper**

Many companies are striving to become one of their carriers’ preferred customers. It’s not unusual for carriers to increase rates to their preferred customers by only half as much as they raise them to their “difficult” customers.

Shippers must earn this preferential status, and it doesn’t come easily. They must, for example, be willing to share their shipping forecasts with their carriers to help them plan better for their near-term equipment needs. In addition, carriers want shippers to establish suitable work processes that will reduce carriers’ dwell times. Dwell time refers to the period of time a truck is idle, waiting to be either loaded or unloaded. Long-haul drivers sometimes spend as much as 25 percent of their workdays waiting for their trucks to be unloaded. Carriers would also like shippers to pay their freight invoices on time and electronically, because they operate on thin margins and cash flow is a dominant concern. Shippers who do pay their carriers quickly and reliably have been shown to generally fare better during rate negotiations.

Shippers have long used scorecards to evaluate carriers’ performances, based on such criteria as on-time pickups, on-time deliveries and freight damages. Now, many shippers are providing scorecards that gauge their own performances based on such metrics as load availability, driver dwell times (the period of time a truck is idle waiting to load or unload) and forecast accuracy. One consumer packaged goods (CPG) manufacturer has gone a step further and offered to split the cost savings with its customers resulting from unloading the delivery trucks within two hours, and 97 percent of its customers now participate in this incentive program.

### **Shifting to Less Expensive Modes of Transportation**

Many companies are reviewing their service requirements and freight distances in search of opportunities for shifting to less costly modes of transport. For example, if they can shift from air freight to expedited surface transport, they can often realize cost savings of as much as 30 to 50 percent, while maintaining competitive service within distances of 1,000 miles. Similarly, in cases where the distances exceed 750 miles, shippers can also realize substantial cost savings by shifting from long-haul, over-the-road tractor trailers to intermodal rail service with the final deliveries pulled by trucks.

## Improve Cube Utilization

**Many trucks that are said to be fully loaded still have large amounts of spare carrying capacity. Some companies today are striving to reduce this underutilized capacity by increasing the average loads carried by their trucks.** Supply chain professionals refer to this strategy as improving cube utilization, but it simply means packing more “stuff” into truckloads and reducing the extent of underutilized capacity.

One retailer of sporting goods, for example, applied this strategy to the truck shipments of its broad array of diverse products – ranging from large, bulky canoes to dense, heavy dumbbells. Toward this end, it hired additional warehouse workers for its DCs and trained them to load its outbound trucks more fully and efficiently. This initiative proved to be successful and improved the cube utilization of its truckloads by 14 percent on average, with commensurate savings in freight-miles and fuel consumption. These freight cost savings were about twice as large as the incremental cost of the extra loading labor.

Several CPG companies have changed the ways that they package their goods to make them more cube-efficient. One of the nation’s leading manufacturers of liquid laundry detergent has re-constituted the detergent into an extremely condensed format resembling a paste, which occupies only a fraction of the shelf or truck space that it did as a liquid. This paste is shipped from manufacturing plants to regional DCs in many fewer trucks, and it is reconstituted into liquid form at the DCs and then shipped to customers. This company’s dry detergent line is also being produced in a more concentrated form, reducing its shelf space and truck space by 30 percent.

## Near-shoring

Higher oil and fuel prices are impelling many North American companies to re-evaluate their production sourcing networks. In general, Mexican and South American manufacturing facilities appear to be gaining market share at the expense of their Asian rivals, while American-based manufacturing facilities are also gaining market share at the expense of their rivals in Mexico and Asia. However, any manufacturing plants that are moved from overseas to the United States are likely to be highly automated, state-of-the-art facilities. Higher oil prices may well spur a new round of technological innovation in the United States involving automated manufacturing facilities.

**But companies are opting to shift to near-shore or onshore production sources for many other reasons, besides the run-up in fuel prices. Chief among the other drivers are recurring product-quality issues, repeated patent infringements, regulatory compliance and the substantial run-up in labor costs in Asia and other offshore locations.** In a survey of manufacturing and retail executives conducted in 2009 by AMR Research, a subsidiary of Gartner, Inc., respondents revealed – by a ratio of 5:1 – that they planned to increase their near-shoring sourcing and manufacturing activities. This survey also indicated that Mexico is the preferred near-shoring location, with 84 percent of respondents choosing it as their number one choice. Indeed, Mexico City is 6,400 miles and two to three weeks closer to Chicago than Shanghai.

The Manufacturers Benchmarking Report issued by the Outdoor Industry Association in 2011 sheds light on how manufacturers of outdoor products have shifted their sourcing networks in response to events of the past three years. Those manufacturers are outsourcing less from China and Vietnam and more from other parts of Asia and, to a lesser extent, from the Caribbean Basin



and South America. Moreover, larger-sized companies reportedly sourced more products domestically in 2010 than in 2007, when the previous Benchmarking Report had been issued. Eighteen companies with sales exceeding \$20 million a year sourced 39.2 percent of their sales from U.S.-based factories in 2010, whereas 12 companies in that same cohort had sourced 29.3 percent of their sales from U.S.-based manufacturers in 2007.

Other industries are moving in a similar direction. A supply chain executive for a consumer electronics company explained that, “What we’re finding today is that from a flexibility and cost standpoint, we have moved more [sourcing] volume into low-cost regional manufacturing sites in the Americas, especially Mexico. In the last several years, China’s labor costs have gone up tremendously....Materials prices have also shot up. So the cost differentials have narrowed substantially. Plus, transportation costs continue to spiral upward. Today, we’re looking at increasing the percentage of regional manufacturing – Mexico for the United States; and Eastern Europe and Turkey for Europe. These shifts are based on rising labor rates in China and our rising logistics expenses.”

### **Renegotiating Freight Rates**

In recent years, many shippers have been able to realize substantial freight cost savings simply by renegotiating with their carriers for lower freight rates. Such renegotiations usually involve detailed reviews and analyses of existing carrier contracts and relationships, and this strategy has emerged as the logistics’ industry’s newest and most popular best practice.

The cost savings often prove to be substantial. For example, one large chip manufacturer and a major industrial pipe manufacturer each succeeded in reducing their freight rates by 30 percent in several of their lanes. Many other shippers have reported lesser rate reductions in the range of about 10 percent. These negotiations occasionally extend beyond rate reductions to include hidden freight transport efficiencies. One company, for example, found that one of its carriers had significant empty miles in a lane that the shipper could fill part way – a win-win for both parties.

Shippers are finding similar freight savings in the fuel surcharges (FSCs) that they are being charged by their carriers. Typically, the rising cost of fuel is passed on to shippers as an accessorial charge – i.e., the fuel surcharges – that the carriers calculate as a fixed percentage of their base or negotiated rates and then add to the freight bills. The developing best practice is for shippers to negotiate the amounts of the surcharges as well as the base rates. One large CPG company bases the fuel surcharge that it will pay on the wholesale price of gasoline rather than the retail price, because most carriers purchase their fuel at wholesale prices. A high-tech company has set a pricing metric for itself where the fuel surcharge that it is willing to pay is equal to 100 basis points less than the national average for surcharges.

### **Concluding Remarks**

No one knows where oil prices will be in six months, one year or five years from today. But the strongly held consensus view is that they will be higher than they are today.

Higher oil and fuel prices will translate into higher freight transportation costs for supply chains and distribution networks. Today in the United States, transportation costs account for about 50 percent of the total costs for supply chains and distribution. Supply chain executives have been tasked with figuring out how to mitigate the impact of these rising costs on their enterprises’

bottom lines, and they have indeed risen to the challenge. Supply chain professionals have designed and implemented a dozen alternative strategies in varying degrees. Some are fairly straight-forward - like packing more items into trucks to reduce their unused capacity, re-negotiating with carriers for lower freight rates or surcharges or working into the good graces of one's carriers to become a preferred customer. Other strategies are more complicated and costly, involving reconfigurations of distribution networks or sourcing networks.

The findings of this research project do cast some doubt on the widely held notion that companies will respond to the steep run-up in fuel prices by adding more DCs to their distribution networks. While this view is surely correct directionally, **the actual magnitude of the impact on the demand for distribution space would appear to be fairly small.** Yes, adding DCs does reduce the overall distances between the DCs and their customer destinations, yielding savings in miles traveled and fuel consumed. But adding DCs also entails not only higher operating and capital costs for the extra DCs, but also higher carrying costs for additional inventories. **Moreover, it is also clear that companies have many other options open to them for mitigating the impact of higher fuel costs on their bottom lines besides reconfiguring their supply chains.**

All things considered, what's most remarkable about supply chain professionals is their ingenuity. They are the consummate problem solvers in the business world. Problems are everyday occurrences for them - ranging from missed shipments and flat tires to hurricanes, tornadoes and tsunamis. When problems occur, supply chain professionals figure out how to overcome them, relying on simple or complex strategies. It's what they do every day, and it's what they're continuing to do in response to the run-up in oil and fuel prices.

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